LISTING OF THE CLAIMS

This listing of the claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (Currently Amended)

A line-of-sight detection method of a subject using:

a first camera for measuring the position of a pupil relative to a coordinate system; a second camera having a light source arranged at a known position in the coordinate system and forming a corneal reflection center to obtain data of a size of vector r from the corneal reflection center to a pupil center and an angle ϕ of the vector r relative to a coordinate axis of the coordinate system; and a calculation means for calculating the line-of-sight direction for executing steps below based on information from each of the cameras, comprises the stages of:

determining a relational formula, including the steps of:

obtaining data on a coordinate point O of the position of a pupil of a subject with the first camera by making the subject gaze at ~~on~~ a known point G in the coordinate system;

obtaining, in the state of the subject, data of the corneal reflection center, a size of vector r from the reflection center to a pupil center P, and an inclination ϕ of the vector r relative to the coordinate axis with the second camera;

calculating an angle θ between a line connecting a reference position of the second camera and the pupil center and a line-of-sight of the subject by the calculation means; and

calculating a formula $\theta = f(r^*)$ showing a relationship between r^* related to r and θ based on the measured values and calculated value; and

determining a line-of-sight, including the steps of:

obtaining data on a coordinate point O' of the pupil position of the subject with the first camera by making the subject gaze at an unknown point G' in the coordinate system;

obtaining data of the corneal reflection center, a size of vector r' from the reflection center to the pupil center P, and an inclination ϕ' of the vector r' relative to the coordinate axis with the second camera; and

calculating $\theta' = f(r^{*\prime})$ by using the relational formula to obtain the unknown point G' from the inclination ϕ' and θ'.

Claim 2 (Original)

The line-of-sight detection method of the subject according to claim 1, wherein r* is r itself or a corrected value of r based on OP, and r*' is r' itself or a corrected value of r' based on OP'.

Claim 3 (Original)

The line-of-sight detection method of the subject according to claim 1, wherein the first camera is a stereo camera arranged by aligning a baseline in a horizontal axis direction of the coordinate system, and a light source of the second camera is constructed so as to provide an optical axis that is substantially aligned with that of the second camera.

Claim 4 (Currently Amended)

The line-of-sight detection method of the subject according to claim 1, wherein the first camera is a stereo camera, and a light source of the second camera is constructed so as to provide an optical axis that is substantially aligned with that of the second camera ~~formula $\theta = f(r^*)$ showing the relationship between r* and θ is given by $\theta = k \times r^*$ (where k is a constant)~~.

Claim 5 (Currently Amended)

The line-of-sight detection method of the subject according to claim 1, wherein the formula $\theta = f(r^*)$ showing the relationship between r* and θ is given by $\theta = k \times r^*$ (where k is a constant) ~~pupil is one of pupils of the subject~~.

Claim 6 (Currently Amended)

A line-of-sight detection method of the subject according to claim 1, wherein the pupil is one of pupils of the subject ~~device of the subject, comprising:~~

~~a first camera for measuring a position P of a pupil relative to the coordinate system;~~

~~a second camera having a light source arranged at a known position in the coordinate system to obtain data of a size of vector r from the corneal reflection center to a pupil center illuminated by the light source and an angle ϕ of r relative to the coordinate axis; and~~

~~a calculation means for executing the steps of:~~

~~obtaining data on a coordinate point P of the position of a pupil of a subject with the first camera by making the subject gaze at a known point G in the coordinate system;~~

~~obtaining, in the state of the subject, data of the corneal reflection center, a size of vector r from the reflection center to a pupil center P, and an inclination ϕ of the vector r relative to the coordinate axis with the second camera;~~

~~calculating an angle θ between a line connecting a reference position of the second camera and the pupil center and the line-of-sight of the subject and calculating a formula θ = f (r*) showing a relationship between r* related to r and θ;~~

~~obtaining data on a coordinate point O' of the pupil position of the subject with the first camera by making the subject gaze at an unknown point G' in the coordinate system;~~

~~obtaining data of the corneal reflection center, a size of vector r' from the reflection center to the pupil center P, and an inclination ϕ' of the vector r' relative to the coordinate~~

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~~axis with the second camera; and~~

~~calculating $\theta' = f(r^{*\prime})$ from $r^{*\prime}$ related to r' by using the relational formula to further obtain the unknown point G' from ϕ' and θ'~~.

Claim 7 (Currently Amended)

~~A three-dimensional view-point measurement device, comprising: two cameras, a first light source arranged near one of the two cameras, a second light source arranged near another of the two cameras, a control means for controlling ON/OFF of the first light source and the second light source and obtaining an image signal in sync with ON/OFF, and a calculation means for extracting a pupil and corneal reflection from the obtained image signal.~~

An line-of-sight detection device of the subject, comprising:

a first camera for measuring a position P of a pupil relative to the coordinate system;

a second camera having a light source arranged at a known position in the coordinate system to obtain data of a size of vector r from a corneal reflection center to a pupil center illuminated by the light source and an angle ϕ of r relative to the coordinate axis; and

a calculation means for executing the steps of:

obtaining data on a coordinate point P of the position of a pupil of a subject with the first camera by making the subject gaze at a known point G in the coordinate system;

obtaining, in the state of the subject, data of the corneal reflection center, a size of vector r from the reflection center to a pupil center P, and an inclination ϕ of the vector r relative to the coordinate axis with the second camera;

calculating an angle ϕ between a line connecting a reference position of the second camera and the pupil center and the line-of-sight of the subject and calculating a formula $\theta = f(r^*)$ showing a relationship between r^* related to r and θ;

obtaining data on a coordinate point O' of the pupil position of the subject with the first camera by making the subject gaze at an unknown point G' in the coordinate system;

obtaining data of the corneal reflection center, a size of vector r' from the reflection center to the pupil center P, and an inclination ϕ'of the vector r' relative to the coordinate axis with the second camera; and

calculating $\theta' = f(r^{*\prime})$ from r*' related to r' by using the relational formula to further obtain the unknown point G' from ϕ' and θ'.

Claim 8 (Currently Amended)

A three-dimensional view-point measurement device, comprising: two cameras, a first light source arranged near one of the two cameras, a second light source arranged near another of the two cameras, a control means for controlling ON/OFF of the first light source and the second light source and obtaining an image signal in sync with ON/OFF, and a calculation means for extracting a pupil and corneal reflection from the obtained image signal ~~and calculating a line of-sight vector from these positions~~.

Claim 9 (Currently Amended)

A three-dimensional view-point measurement device, comprising: two cameras, a first light source arranged near one of the two cameras, a second light source arranged near another of the two cameras, a control means for controlling ON/OFF of the first light source and the second light source and obtaining an image signal in sync with ON/OFF, and a calculation means for extracting a pupil and corneal reflection from the obtained image signal and calculating a line of-sight vector from these positions ~~a three-dimensional position of the pupil from these positions~~.

Claim 10 (Currently Amended)

A three-dimensional view-point measurement device, comprising: two cameras, a first light source arranged near one of the two cameras, a second light source arranged near another of the two cameras, a control means for controlling ON/OFF of the first light source and the second light source and obtaining an image signal in sync with ON/OFF, and a calculation means for extracting a pupil and corneal reflection from the obtained image signal and calculating a three-dimensional position of the pupil from these positions ~~a three-dimensional position of the pupil from these positions according to claims 7 to 9, wherein the first light source and the second light source are configured to have an approximately identical emission wavelength~~.

Claim 11 (New)

The three-dimensional view-point measurement device according to claim 8, wherein the first light source and the second light source are configured to have an approximately identical emission wavelength.

Claim 12 (New)

The three-dimensional view-point measurement device according to claim 9, wherein the first light source and the second light source are configured to have an approximately identical emission wavelength.

Claim 13 (New)

The three-dimensional view-point measurement device according to claim 10, wherein the first light source and the second light source are configured to have an approximately identical emission wavelength.